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## EUROPEAN PATENT APPLICATION

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### (54) Device and cleaning pad for cleaning or treating surfaces or for applying media to surfaces

(57) The present invention relates to a device (1, 1', 1'') for cleaning or treating surfaces such as inner surfaces of a toilet bowl with a handle (8, 8', 8''), a grip portion (2, 2') and a cleaning head (3, 3', 3''), and a cleaning pad (4, 4') being removably attachable to the device (1,

1', 1''). The device comprises attachment means (5, 5', 5'') operable, in use, to attach and/or release a cleaning pad (4, 4'), the attachment means (5, 5', 5'') being operable from the upper part such that manual handling of the pad (4, 4') and/or the cleaning head (3, 3', 3'') is avoided.

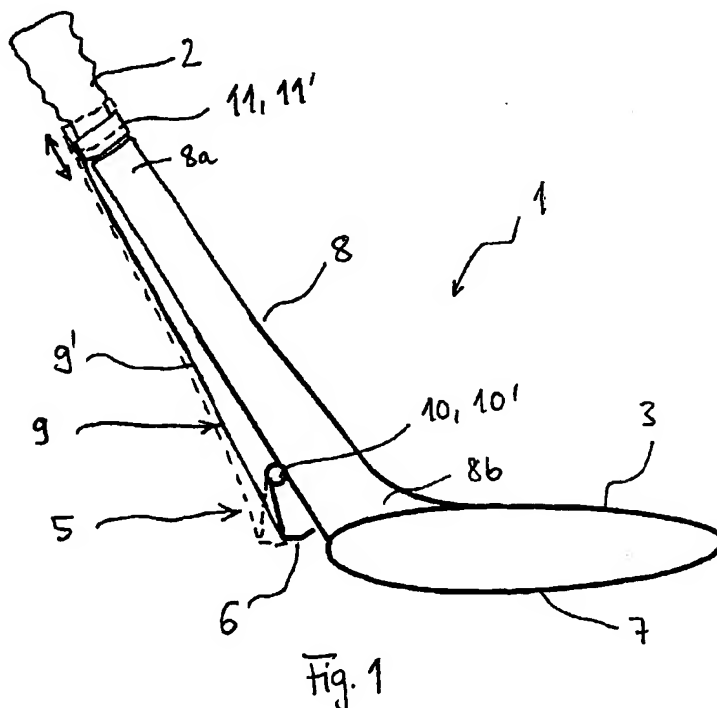


Fig. 1

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## Description

**[0001]** The present invention relates to a device for cleaning or treating surfaces or for applying media to surfaces according to claim 1, especially for cleaning toilet bowls and the like. The invention further relates to a cleaning pad according to claim 10.

**[0002]** Cleaning a toilet bowl is typically one of the most undesirable jobs for most persons. Nevertheless, toilet bowls must be kept clean in order to prevent sanitary problems, the potential for irritable smells, and the possibility of harmful bacteria buildup.

**[0003]** Various types of bowl cleaning products are known. Such products typically fall within two categories, namely, cleaning by hand with a bowl cleaning device or with automatic "in tank" or "in bowl" cleaners. Hand cleaning typically takes the form of a toilet cleaning brush or sponge. Such devices, however, are displeasing due to the excessive dripping therefrom, and because storage between uses is unsanitary. Automatic "in tank" or "in bowl" cleaners, which dispense a dosage upon flushing of the toilet, generally are not as effective as manual scrubbing. Therefore most consumers typically supplement such automatic cleaners with hand scrubbing and cleaning.

**[0004]** Some proposals for cleaning devices have been made that overcome some but not all problems of conventional "in bowl" hand cleaning devices.

**[0005]** The US 4 852 201 discloses a toilet bowl cleaning device with a cleaning pad and a holder for the pad. The pad is disposable and replaced after each use, thus avoiding the problem of storing a used cleaning device. The holder comprises an elongate rigid handle having a grip portion at one end and a head portion at its opposite end. A tongue member is pivotally mounted on the head portion between a first attached position for attaching the cleaning pad to the handle and a second detached position for releasing the pad. In the first attached position, the tongue member can be releasably locked to the head by a snap lock. The cleaning pad in the shape of a rectangular slipper receives the tongue member and is then clamped between the tongue member and the head portion.

**[0006]** Though this cleaning device reduces the need for manual handling of the cleaning pad it still requires holding of the pad when attaching it since the front portion of the tongue member is not directional. Furthermore, for detachment of the pad the snap locks have to be opened manually which requires unpleasant contact with the cleaning device in a region very close to the wet and dirty cleaning pad.

**[0007]** Another cleaning device comprising a handle with a cleaning head and a cleaning pad affixed to the head is known from US 5 862 565. Here, however, the cleaning pad is fixed to the head by a hook and loop fastening mechanism. Thus, it has to be removed by hand.

**[0008]** Yet another cleaning device comprising a han-

dle with a cleaning portion and a cleaning pad attached to it is disclosed in US 5 488 748. The cleaning pad comprises lateral pads extending from opposed sides of a planar base pad which form two parallel channels by being upwardly and inwardly curved. The handle includes a pair of laterally opposed longitudinal projections which can be slidably positioned within the channels. The cleaning pad, however, has to be attached and removed manually or with a specially designed dispensing device.

**[0009]** It is therefore an object of the invention to provide a device for cleaning or treating surfaces or for applying media to surfaces, especially for cleaning toilet bowls and the like, which avoids the problems of the cleaning devices mentioned before and which especially avoids the need for manual handling of the cleaning pad.

**[0010]** This object is achieved by a device for cleaning or treating surfaces or for applying media to surfaces as specified in claim 1. Further, the object is achieved by a cleaning pad as specified in claim 10. Beneficial embodiments of the invention are described in the dependent claims, the description and the drawings.

**[0011]** The inventive cleaning device allows the whole process of attaching and detaching a cleaning pad to the handle being accomplished remotely. To achieve this, the device comprises attachment means, comprising e.g. a flap or a clamp, being remotely operable. For remote operation from an upper part of the handle, e.g. from a grip portion of the handle, the handle preferably comprises first operating means, e.g. a lever mechanism. Thus, the user can attach and detach the pad by simply moving, e.g. pushing, dragging or turning, a part of the device near the grip portion, while touching the pad or parts of the handle having contacted the treated surface, WC water or other unpleasant areas is avoided. The cleaning pad is disposed after each use, e.g. by flushing it down the toilet, thus storing the cleaning device is hygienic.

**[0012]** The inventive cleaning pad has a base portion with a bottom side and a top side, the bottom side including a cleaning portion. A sheet is attached to the base portion and covers at least a part of top side, wherein the sheet and the base portion form a pocket. The inventive cleaning pad is preferably used with a handle having a cleaning head.

**[0013]** Preferably, handle and cleaning pad are shaped such that a well defined flat or bent, preferably convex cleaning surface is formed when the pad is attached to facilitate equal distribution of cleaning detergent and exerted pressure over the treated surface when scrubbing. For example, the cleaning pad comprises a pocket to slidably receive a front portion of the cleaning head and the bottom cleaning portion of the pad is stretched over a bottom portion of the handle. Alternatively, the cleaning pad can comprise a stable frame, e.g. a ring, that ensures that the bottom portion of the pad is more or less parallel to the bottom portion

of the cleaning head even if the pad is fixed to the head at single points only.

[0014] The cleaning head is preferably oval or tear-drop or diamond shaped to facilitate access to small angular areas, e.g. under the toilet rim. For attachment of a pocket shaped pad a cleaning head with a three dimensional ellipsoid, diamond or tear-drop shaped frame is advantageous as it helps to create a three dimensional pad shape. Further, as the head is directional, slipping into the pad pocket can be accomplished without holding the pad.

[0015] Preferably, the cleaning device is designed such that the attachment means remain in a first state where a pad is kept attached to the handle unless the attachment means are operated. Upon actuation of a movable member, e.g. a lever, from an upper part of the handle the attachment means change to a second state in which an attached pad is released or a new pad can be brought into attachment position such that it is attached when the attachment means move back to the first attached state. Preferably, the device therefore comprises returning means for returning the attachment means automatically to the first state. The returning means preferably include a spring mechanism, which is simple to manufacture.

[0016] Preferably, the inventive device further comprises ejection means operable, in use, to eject the cleaning pad, the ejection means being operable from an upper part of the handle. For example, the ejection means comprise a pushing member operable, in use, to push the cleaning pad away from the handle. Alternatively, the cleaning head is hinged such that the cleaning pad can be torn apart.

[0017] The inventive cleaning pad comprises a water degradable laminated or non-woven cellulose structure, preferably recycled, welded by heat, pressure or adhesive, which can be manufactured at low cost. The water degradable cleaning pad is ecologically disposable, for example by flushing it down a toilet.

[0018] Preferably the cleaning pad further comprises cleaning detergent in the shape of powder and/or at least one tablet of cleaning detergent secreted and/or attached at the cleaning portion to facilitate the cleaning process. For example, a tablet of cleaning detergent which decomposes in the presence of water is arranged at the cleaning surface. Alternatively, the base portion of the pad is shaped like a cushion, the cushion containing cleaning detergent, e.g. a tablet or powder. By at least the bottom side respectively the cleaning portion of the base portion being water permeable, the cleaning detergent dissolved by and in water is secreted at the cleaning portion.

[0019] The inventive apparatus, comprising an inventive device and an inventive cleaning pad may be used for WC cleaning, but as well for dish washing, car washing, painting and other actions where direct manual contact with the medium applied to the treated surface should be avoided. Shape and size of the cleaning head

and the pad should be adapted to the application.

[0020] Brief description of the drawings:

- |    |            |  |
|----|------------|--|
| 5  | Fig. 1     | shows a side view of a first inventive cleaning device;                                |
|    | Fig. 2     | shows a partial view of the cleaning device of fig. 1 with a pad attached;             |
| 10 | Fig. 3     | shows an inventive cleaning pad with a pocket and a rearward tab;                      |
|    | Fig. 4     | shows a grip portion of a cleaning device;   |
| 15 | Fig. 5     | shows a second inventive cleaning device;  |
|    | Fig. 6     | shows a sectional view of the device of fig. 5;  |
| 20 | Fig. 7     | shows a sectional view of a third inventive cleaning device with a pad attached;       |
|    | Fig. 8     | shows a side view of the device of fig. 7;   |
| 25 | Fig. 9     | shows a side view of the device of fig. 7 with pad attached;                           |
|    | Fig. 10    | shows a perspective view of the device of fig. 7;                                      |
| 30 | Fig. 11    | shows a second cleaning pad;   |
|    | Fig. 12a-c | show a station suitable for facilitating the fixing of the pad to the cleaning device. |
| 35 |            |  |

[0021] Fig. 1 and 2 show a first inventive cleaning device 1 designed as a hygienic replacement for conventional WC brushes in a side view without cleaning pad (fig. 1) respectively with an attached cleaning pad 4 (fig. 2). The cleaning pad 4 itself is shown in fig. 3.

[0022] The device comprises an elongate handle 8 having a grip portion 2 at the upper part 8a and a cleaning head 3 at its opposite lower part 8b. The cleaning head 3 is made of water impervious foam material capable of only small deformations under the stresses normally experienced during the WC cleaning operation. The cleaning head 3 has a three dimensional oval shape which is dimensioned to fit preferably tightly into and to be at least partly surrounded by the cleaning pad 4. The flexible cleaning pad 4 comprises therefore a flat oval base portion 19, made of tissue paper, non-woven fabric or the like. Preferably, the pad 4 consists of paper laminate which protects the foam from contamination and is wiped over the surface of the WC, possibly with an active cleaning powder integrated into the bottom layers of the pad. The pad 4 further comprises a sheet 17 attached to the base portion 19 and forming a cleaning

head receiving pocket 18 with the base portion 19. The pad 4 further comprises a tab 21, preferably made of tearing resistant material, preferably card, located opposite the pocket and projecting upward respectively rearward.

[0023] According to the invention, the device 1 further comprises attachment means 5 for affixing a pad to the device. In fig. 1 and 2, the attachment means 5 include a clip or clamp 6 located near the lower part 8b of the handle 8. The clamp 6 is able to secure a pad 4 that is slipped over the cleaning head 3 by clamping a pad portion, here the tab 21, and hold it in place during scrubbing. The clamp 6 is movable via a lever mechanism 9, including at least one lever 9' by actuating first operating means 11. In fig. 4, the operating means 11 are located nearby the grip portion 2 and include a collar 11' which is arranged around the upper part 8a of the handle 8 and is able to slide up and down. The lever 9' is directly or indirectly connected to the collar 11' and moves the clamp 6 when the collar 11' is pulled and/or pushed. In fig. 1 and 2 the attachment means 5 are shown in solid lines in a first position where a pad can be held in place. The attachment means 5 are shown in dashed lines in a second position where a pad is released (fig. 1 only). Returning means 10 including a spring 10' connected to the clamp 6 keep the attachment means 5 in the first position when the attachment means 5 are not actuated. The advantage is that the user needs no force to keep the pad 4 attached.

[0024] When pulled over the cleaning head 3 the base portion 19 of the flexible pad 4 is stretched over the convex bottom portion 7 of the cleaning head 3. Its bottom side 20 forms an unruffled cleaning portion for homogeneous application of cleaning detergent and controlled scrubbing.

[0025] Fig. 4A, B show the grip portion 2 of the device of fig. 1 and 2 with the operating means 11 in the first respectively second state. As an alternative to the construction of fig. 1, 2 returning means 15 including a spring 15' are arranged near the grip portion 2. The collar 11' is pressed downward by the spring 15' (Fig. 4A), when not pulled upward by the user (Fig. 4B). By pulling the collar 11' upward, the attachment means 5 move, and a pad can be brought into the attaching position.

[0026] Fig. 5 and 6 show another example for an inventive device 1' with a handle 8'. The cleaning head 3' comprises a three dimensional frame 22 with an oval ring 22a, two wings 22b, 22c bent upward and a bridge 22d bent downward. The cleaning head 3' can be manufactured from a flat solid piece by cutting the shapes of wings and bridge and bending these pieces up respectively down. Alternatively, it is manufactured by injection moulding.

[0027] By moving a clip 23 located near the grip portion a clamp 6' is lowered or raised onto the tab 21 of the cleaning pad 4, as shown in the partly sectional view of fig. 6. The clamp 6' is part of the attachment means 5' which further comprise a lever mechanism 24.

[0028] The cleaning pad 4 is designed to fit around the cleaning head 3', stretching over its bottom portion 7'. A tablet 26 with cleaning detergent is attached at the bottom side 20 of the base portion 19. After use, the clamp 6' is raised to release the tab 21 and the head 3' and pad 4 shaken under water to eject the pad which can then be flushed away.

[0029] Fig. 7 to 10 show a third embodiment of the inventive device 1'', with attached pad (fig. 7, 9) respectively without (fig. 8, 10). The handle 8'' consists of two separated pieces, a shaft 8c and a lower part 8b'. The lower part 8b' of the handle 8'' is an integral part of the cleaning head 3'', e.g. moulded in one piece with the frame 22', as shown in the sectional view of fig. 7. A collar 30 which may be fixed to or an integral part of the shaft 8c is connected to the lower part 8b' via a spring mechanism 31'. The collar 30 as a part of the attachment means 5'' comprises a clamp 6'' resting on the wings 22b', 22c' of the frame 22', as shown in fig. 7, 9 and 10, unless the collar 30 is pulled upward, as shown in fig. 8. A portion of the cleaning pad 4' is clamped between the clamp 6'' and the frame 22' to secure the pad 4' to the device 1''.

[0030] A cleaning pad 4' for the use with a device 1'' as shown in fig. 7 to 10 is shown in fig. 11. Like the cleaning pad 4 of fig. 3 the cleaning pad 4' has an oval shape which is dimensioned to fit preferably tightly around the cleaning head 3'' of fig. 7 to 10. The cleaning pad 4' comprises a flat, but flexible oval base portion 19' and a sheet 17' attached to the base portion 19' and forming a cleaning head receiving pocket 18' with the base portion 19'. The pad 4' further comprises a tab 21' located at the pocket and projecting rearward that can be gripped by the clamp 6''. A tablet 26' with cleaning detergent is attached to the bottom side 20' of the pad 4', as shown in fig. 7.

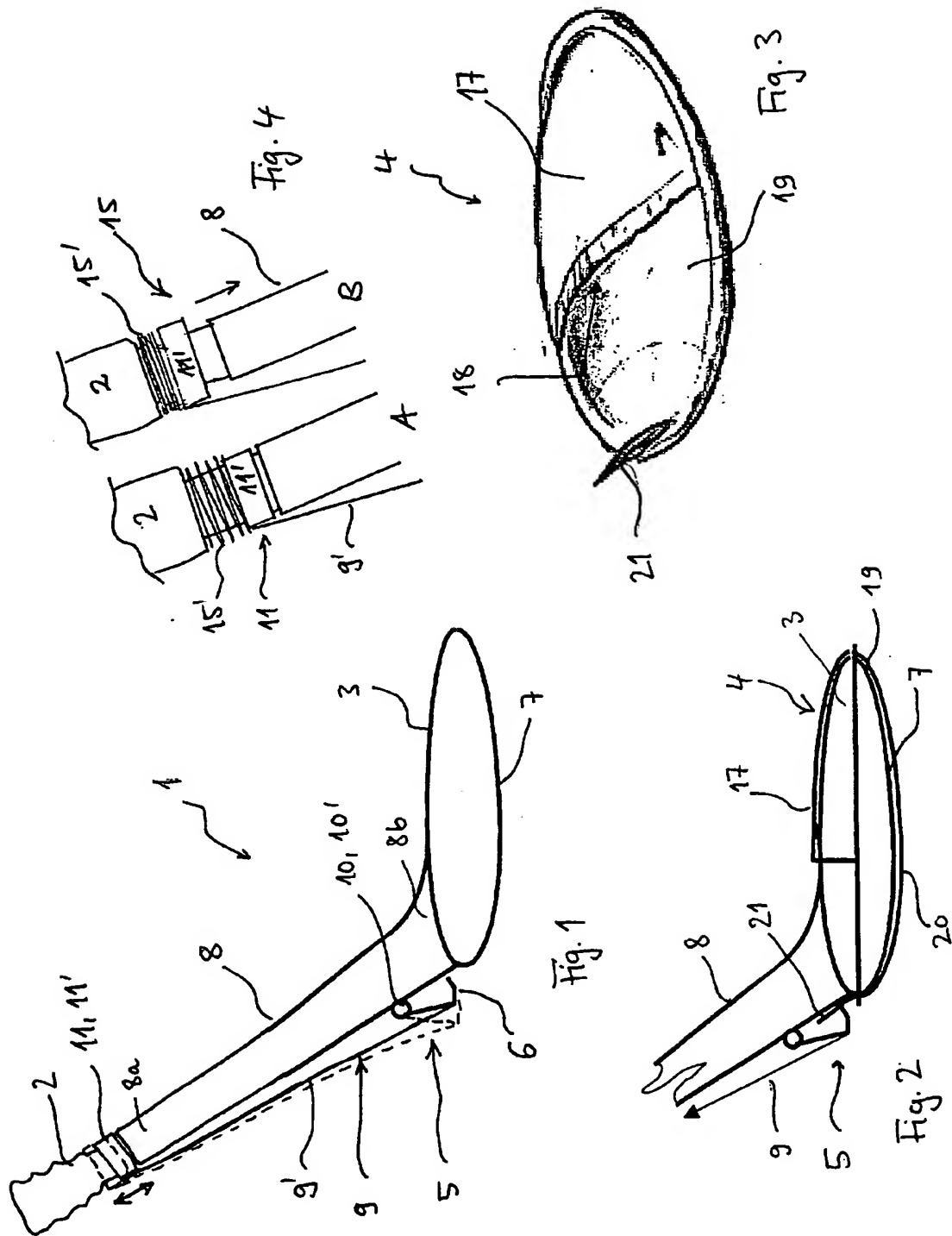
[0031] The cleaning pads 4, 4' preferably consist of water degradable materials, e.g. laminated or non-woven cellulose, tissue paper and/or fleece material, which are preferably recycled, welded by heat, pressure or adhesive. The tabs 21, 21' are preferably made of card or the same material as the pad itself. Preferably several pads are stored in a dispenser with an opening through which the cleaning head can be inserted for loading a fresh pad.

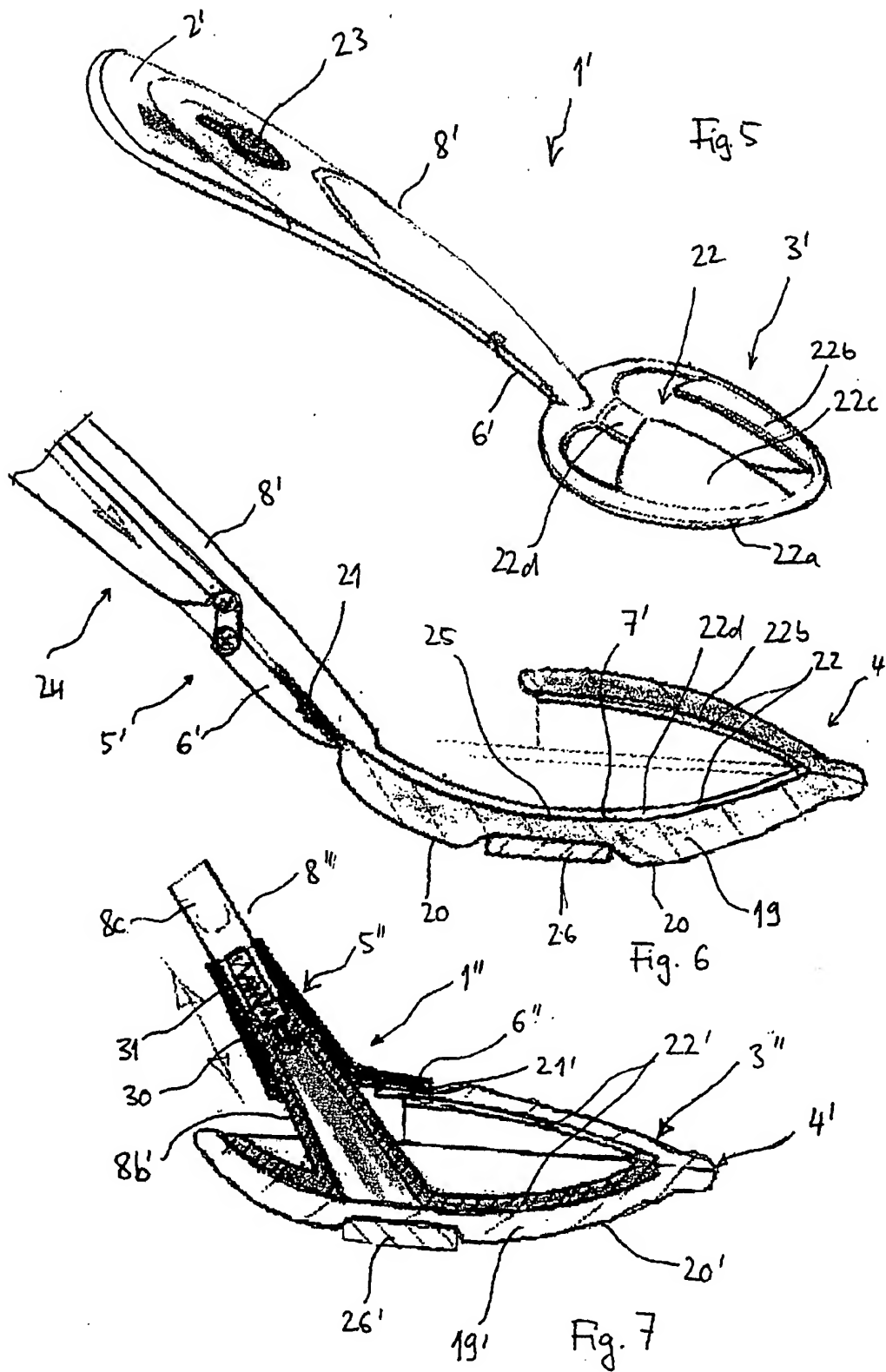
[0032] Fig. 12a-c show a station 32 suitable for facilitating the fixing of a pad 4 to a cleaning device 1. The device 32 with the shape of a square stone has a recess 33 with ellipsoid shape. The contours of the station 32 are such that as the head 3 of the cleaning device 1 is thrust into the pad 4 the tab 21 is forced up the shaft of the handle 8 to be conveniently fixed by the clip or clamp 6 which is raised and lowered by the user.

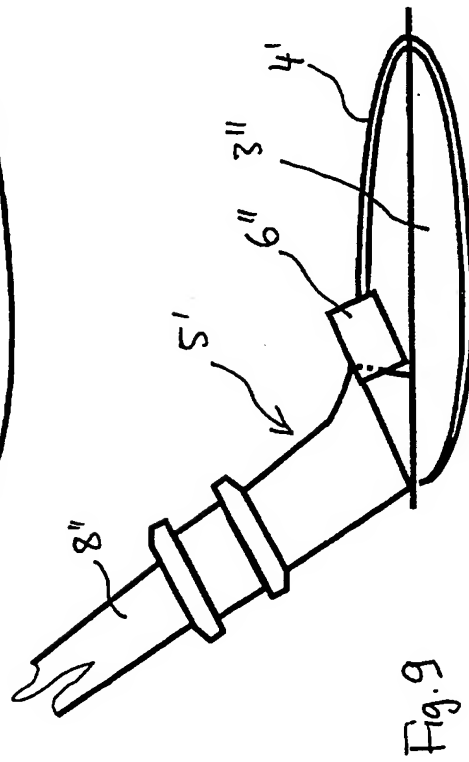
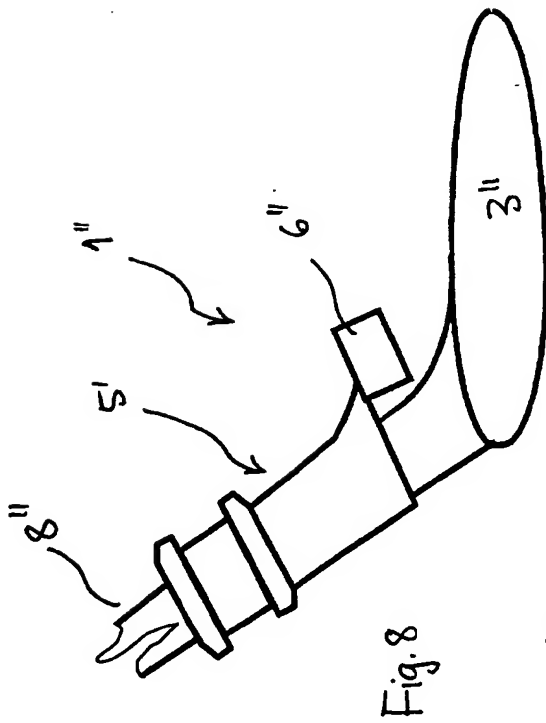
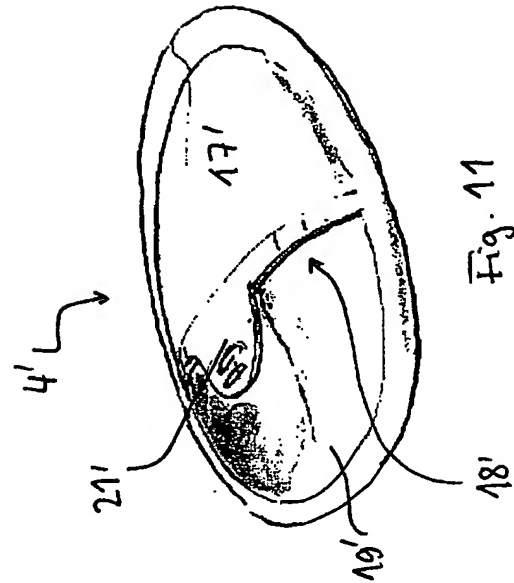
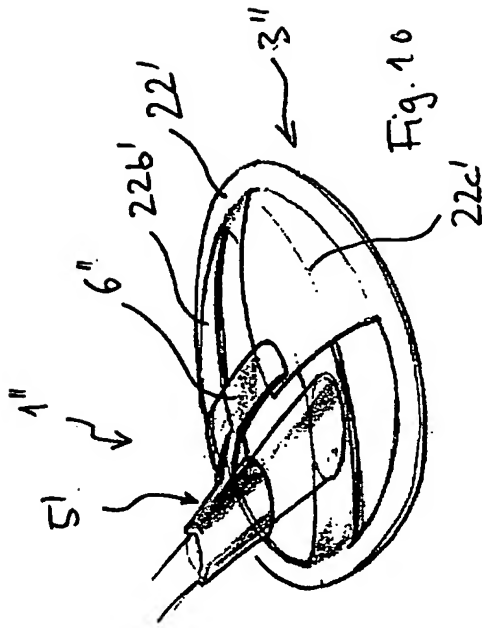
## Claims

1. A device (1, 1', 1'') for cleaning or treating surfaces

- such as inner surfaces of a toilet bowl, comprising a cleaning head (3, 3', 3'') to which a cleaning pad (4, 4') can be removably attached, and a handle (8, 8', 8'') having an upper part (8a) and a lower part (8b, 8b'), wherein the cleaning head is connected to the lower part (8b, 8b') of the handle (8, 8', 8''), and further comprising attachment means (5, 5', 5'') operable, in use, to attach and release a cleaning pad (4, 4'), the attachment means (5, 5', 5'') being operable at the upper part of the handle (8, 8', 8'').
2. Device (1, 1', 1'') according to claim 1, wherein the cleaning head (3, 3', 3'') comprises a three dimensional ellipsoid or tear-drop shaped frame (22, 22').
  3. Device (1, 1', 1'') according to claim 1 or 2, wherein the attachment means (5, 5', 5'') comprise a movable member, preferably a flap or a clamp (6, 6', 6''), that is movable to clamp the cleaning pad (4, 4') or a portion thereof to the device (1, 1', 1''), the clamped portion preferably being a tab (21, 21').
  4. Device (1, 1', 1'') according to one of the preceding claims, further comprising returning means (10, 15) for returning the attachment means (5, 5', 5'') automatically to a first state for attaching the cleaning pad (4, 4'), when the attachment means (5, 5', 5'') are not operated, the returning means (10, 15) preferably including a spring mechanism (10', 15').
  5. Device (1, 1', 1'') according to one of the preceding claims, further comprising a first lever mechanism (9, 24) with at least one lever (9'), the first lever mechanism (9, 24) being mechanically coupled to the attachment means (5, 5', 5'').
  6. Device (1, 1', 1'') according to one of the preceding claims, further comprising ejection means operable, in use, to eject the cleaning pad (4, 4'), the ejection means being operable at the upper part of the handle (8, 8', 8'').
  7. Device (1, 1', 1'') according to claim 6, further comprising a second lever mechanism with at least one lever, the lever mechanism being mechanically coupled to the ejection means.
  8. Device (1, 1', 1'') according to claim 6 or 7, wherein the ejection means comprise a pushing member operable, in use, to push the cleaning pad (4, 4') away.
  9. Device (1, 1', 1'') according to claim 6 or 7, wherein the ejection means are represented by a cleaning head (3, 3', 3'') which includes at least one movable part, preferably a top pivotally mounted on a base, in order to tear the cleaning pad (4, 4') apart after use.
  10. Cleaning pad (4, 4') for cleaning or treating surfaces, preferably for the use with a device (1, 1', 1'') having a cleaning head (3, 3', 3''), the pad (4, 4') having a base portion (19, 19') with a bottom side (20, 20') and a top side (25), and a sheet (17, 17') attached to the base portion (19, 19') and covering at least a part of top side (25), the sheet and the base portion forming a pocket (18, 18').
  11. Cleaning pad (4, 4') according to claim 10, comprising a water degradable laminated or non-woven cellulose structure, preferably recycled, welded by heat, pressure or adhesive.
  12. Cleaning pad (4, 4') according to one of the claims 10 or 11, further comprising a tab (21, 21'), the tab preferably being located at the pocket (18, 18'), projecting rearward, or opposite the pocket (18, 18') at the rear end of the pad (4, 4').
  13. Cleaning pad (4, 4') according to claim 12, wherein the tab (21, 21') is composed of a water degradable cellulose material, preferably recycled paper-based material, cardboard or are formed from compression of the same material as the cleaning pad (4, 4') itself.
  14. Cleaning pad (4, 4') according to one of the claims 10 to 13, further comprising cleaning detergent in the shape of powder and/or at least one tablet (26, 26') of cleaning detergent secreted and/or attached at the bottom side (20, 20') to facilitate the cleaning process.
  15. Apparatus with a device (1, 1', 1'') according to one of the claims 1 to 9 and a cleaning pad (4, 4') according to one of the claims 10 to 14.
  16. Apparatus according to claim 15, wherein the cleaning pad (4, 4') is shaped such that, when attached to the handle (8, 8', 8''), the bottom side (20, 20') is stretched over a bottom portion of the cleaning head (3, 3', 3'').
  17. Apparatus according to claim 15 or 16, wherein the cleaning pad (4, 4') comprises a pocket (18, 18') dimensioned to slidably receive at least a front portion of the cleaning head (3, 3', 3'').









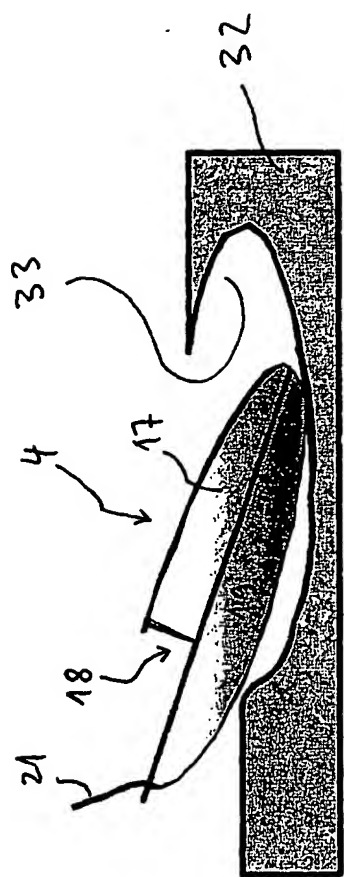


Fig. 12 a

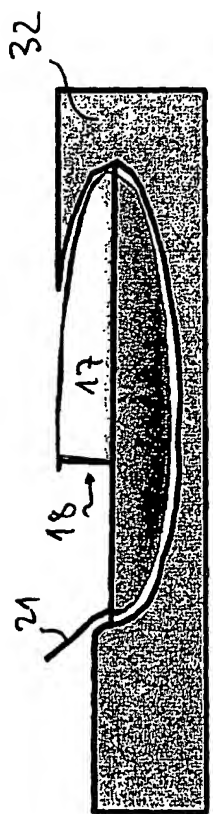


Fig. 12 b

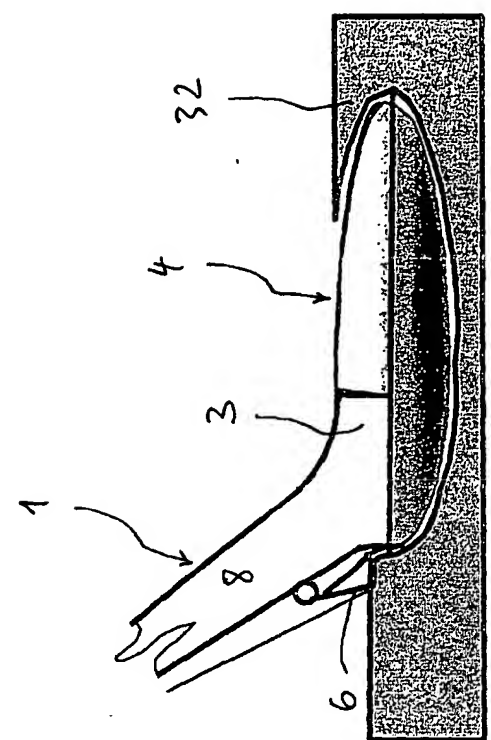


Fig. 12 c



European Patent  
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# EUROPEAN SEARCH REPORT

Application Number  
EP 00 12 0524

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	DE 35 26 085 C (M. KÜGLER) 26 March 1987 (1987-03-26)  * figure 12 *	1,3,4,6, 8,10,11, 15-17	A47K11/10
X	US 5 630 243 A (FEDERICO VERA L ET AL) 20 May 1997 (1997-05-20) * the whole document *	1-5,15, 17	
Y		14	
X	US 1 681 967 A (J. B. ZORN) 28 August 1928 (1928-08-28) * the whole document *	1,3,6,15	
X	US 4 031 673 A (HAGELBERG ANDERS TORVALD SVERK) 28 June 1977 (1977-06-28) * the whole document *	1,3,15	
X	US 3 225 375 A (R. L. ATKINSON ET AL) 28 December 1965 (1965-12-28) * the whole document *	10,11	
Y		14	
A		2	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			A47K A47L
The present search report has been drawn up for all claims			
Place of search <b>THE HAGUE</b>		Date of completion of the search <b>16 March 2001</b>	Examiner <b>Delzor, F</b>
<p><b>CATEGORY OF CITED DOCUMENTS</b></p> <p>X : particularly relevant if taken alone  Y : particularly relevant if combined with another document of the same category  A : technological background  O : non-written disclosure  P : intermediate document</p> <p>T : theory or principle underlying the invention  E : earlier patent document, but published on, or after the filing date  O : document cited in the application  L : document cited for other reasons  &amp; : member of the same patent family, corresponding document</p>			

EPO FORM 1503 03/82 (P04C01)



European Patent  
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Application Number  
EP 00 12 0524

**CLAIMS INCURRING FEES**

The present European patent application comprised at the time of filing more than ten claims.

- ☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

**LACK OF UNITY OF INVENTION**

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

- ☒ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- ☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
- ☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:



European Patent  
Office

**LACK OF UNITY OF INVENTION  
SHEET B**

Application Number  
**EP 00 12 0524**

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

**1. Claims: 1-9,15-17**

cleaning device with a handle and a cleaning head (with claims 15-17 being dependent only on claims 1-9).

**2. Claims: 10-14**

cleaning pad

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 00 12 0524

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
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16-03-2001

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 3526085 C	26-03-1987	WO 8700411 A EP 0270530 A	29-01-1987 15-06-1988
US 5630243 A	20-05-1997	NONE	
US 1681967 A	28-08-1928	NONE	
US 4031673 A	28-06-1977	NONE	
US 3225375 A	28-12-1965	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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